the time in emptying itself, but it is only double that time, which demonstrates the statement.

A complete logical explanation of the action of the pneumogastric can be given on this theory, by assuming that its function consists in diminishing the calibre of the small arteries of the coronary system, and always keeping them somewhat contracted.

PHENOMENA OF COAGULATION IN FROG'S BLOOD [*]

I WAS endeavouring in the autumn of last year, at Prof. Sanderson's instigation, to demonstrate upon the frog some of Brücke's fundamental experiments on the coagulation of the blood, which he performed on the tortoise; I was surprised at the apparent failure of some of them. For instance, having tied a glass tube into the animal's aorta and allowed it to fill with blood, I expected that which was in the tube speedily to coagulate, that which remained in the heart to continue liquid for a considerable time. But no such contrast was observable, both portions of blood remained perfectly fluid for an indefinite time. I say apparently, for, in fact, on subsequently turning out the blood, a slight film of coagulated fibrin was observable attached to the walls of the tube. Of course the corpuscles being the heavier gravitate to the bottom, and the blood thus becomes divided into two portions, a clear fluid above and a mass of red corpuscles below, with a thin filmy stratum of white again on the surface of the latter.

To show that the clear fluid is plasma and not merely serum, that is to say, that it fully retains its coagulability, it is sufficient to take a little up into a very fine, almost capillary, glass tube. The extent of surface to which it is thus exposed very quickly determines its coagulation.

Following up the subject still further, I found the same thing to happen when the blood is allowed to drop into a glass vessel, the whole remaining fluid, except that portion in immediate contact with the sides, the corpuscles subsiding as before, and the supernatant liquid being readily coagulable in a capillary tube.

But frog's blood does not always behave in this manner. It is not unfrequently the case, especially at this season of the year, that the blood of these animals behaves to all appearance precisely as we are in the habit of expecting that blood should behave, that is to say, the commencing subsidence of the corpuscles is arrested, the fluid solidifies, seemingly throughout. And, indeed, in rare instances, the coagulation is complete to the centre, and the mass soon separates into clot and serum, which latter, in these cases, never yields a coagulum in a capillary tube. More frequently, however, on breaking the surface with a knife, the interior of the coagulated mass is seen to be occupied by still fluid blood.

In either case, the coagulated fibrin soon begins to contract; and this contraction proceeds to such an extent that not only is the serum of the blood expressed from it, but it comes to pass that there is no longer room in its meshes for the involved corpuscles, which consequently begin to be squeezed out and to fall to the bottom of the glass. This diminution in volume of the clot may proceed so far that in the course of a few hours the blood may present an appearance precisely as if it had not undergone coagulation at all, there being a mass of corpuscles at the bottom of the vessel, and a clear supernatant fluid. The contracted remains of the clot may however be always found, although often obscured by the liberated corpuscles. Now, this disappearance of the clot of frog's blood under certain circumstances was noticed some years ago by v. Reclinghausen, and ascribed by him to a re-liquefaction of the fibrin; and not un naturally, if we consider the astonishing diminution in bulk which it undergoes, and the fact that the serum in such cases is frequently found to yield a further coagulum.

But in every case of the latter kind, *i.e.* in every case in which the supernatant fluid yields a coagulum in a capillary tube, it will have been found that the primary coagulation was incomplete, *i.e.* that the central parts of the blood remained fluid, whereas on the other hand it is certain that when the primary coagulation has been complete, no further coagulum is *ever* obtainable, although, in this case also, the clot may have contracted to a relatively exceedingly small bulk, in fact, may have almost disappeared.

A further proof, if one were needed, that the diminution of the clot is due merely to contraction and not re-liquefaction of fibrin, is to be found in the examination under the microscope, using an immersion objective, of the process as it occurs in a very thin walled and fine capillary glass tube.

The phenomena here observed are wholly those of contraction: first simply serum, then white corpuscles, and finally red corpuscles being expressed, until a mere thread of fibrin remains, almost obscured by the corpuscles and still including a few.

Throughout the whole process, however, there is no trace of a re-liquefaction of fibrin; this would of course involve the dropping away of the corpuscles from the sides; on the contrary, they are most evidently squeezed out, some of them being actually ruptured in the passage and appearing on the exterior of the clot as small reddish spheroids. The facts then, briefly, are these: that frog's blood, especially if taken during the winter months, exhibits but very little tendency to coagulate, with the exception of the portion in immediate contact with a foreign surface; that, when apparently coagulated throughout, the central portions are very apt to remain fluid, and to impart coagulability to the expressed serum; that the clot when formed frequently tends to attain a relatively very small bulk; and, finally, that this diminution in bulk is due to contraction merely, not reliquefaction of the fibrin.

PHYSICS

Acoustic Experiments on the Seine during the Siege of Paris

IN the experiments made by Colladon and Sturm on the Lake of Geneva, in 1827, to determine the velocity of sound in water, the source of sound was a bell, weighing sixty-five kilogrammes, fixed to a boat immersed in the water near Rolle. Another boat, moored near Thonon, carried the observers, who employed a long acoustic tube made of metal, one extremity of which, widened and closed with a membrane, was thrust into the water. The distance from Rolle to Thonon is about 13,500 metres, so that the range of the sound was considerable. The water in that part of the lake is of great depth.

During the siege of Paris, the idea arose of establishing an acoustic telegraph by means of the Seine, between the invested city and provinces that had not been invaded. The Geneva experiments appeared to favour the proposal.

M. Lucas was charged by the Minister of Public Works to make some experiments on the subject, which he accordingly did in November, 1870. He gives an account of these to the Paris Academy.

In the first series, a bell weighing forty kilogrammes was lowered by a windlass from the bow of a barge, to a position twenty or thirty centimetres from the bottom. It contained a clapper, which was moved by means of wires carried up to the barge. Two workmen were charged to ring the bell at certain fixed intervals, while the observers, in another boat, marked the effect at different distances, being carried along by the current. The acoustic tube employed was 1·50m. long, and the membrane of its orifice, immersed in the water, was turned towards the bell. At the distance of a few metres, a dull sound was heard (like that of a drum beat with a drum-stick), at each stroke given to the bell. The intensity diminished with the distance, and the sound ceased to be perceptible at about 1,800 metres. The result was constant for experiments repeated at different parts of the river.

In a second series of experiments, a bronze bell, weighing 354 kilogrammes, was used. This was hung in a wooden frame weighing 446 kilogrammes, constructed in the form of a quadrangular pyramid. The hammer of the bell weighed sixteen kilogrammes, and was moved by wires, as in the other case. The frame and bell were suspended by chains from the four corners, between two barges, and then lowered into the water. The mode of observation was the same as in the former case.

A few metres from the barge a slight metallic sound was heard, doubtless from the acoustic tube vibrating with the membrane. The sound soon became dull, its intensity decreased rapidly with the distance; at 1,400 or 1,500 metres there was no perception of it.

Comparing these experiments with those of the first series, we have the unexpected result that the very intense sound of a bell weighing 354 kilogrammes has a less range than the weaker sound from a bell of forty kilogrammes.

In a third series, a small bell, twelve centimetres diameter, was sounded in the water alternately with the bell of forty kilo-

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[*] Paper read before the British Association at Brighton in Section D. (Department of Anatomy and Physiology), by E. A Schäfer, M.B.

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grammes; the range of the latter extended, as before, to 1,600 or 1,800 metres; that of the little bell was small, it exceeded one kilometre, however. M. Lucas concludes from the experiments that the range of sound in a river, even in the direction of motion of the water, is much less than that of sound in a lake; and that by increasing considerably both the intensity and the gravity of the sound, the range is but little increased, and may even be diminished. It further appears that, with equal intensity, the range of sound in a river will increase with its acuteness. If so, a considerable range ought to be obtained, he thinks, with a blast of compressed air for the sonorous source. A. B. M.

SCIENTIFIC SERIALS

THE *Geological Magazines*, Nos. 97—99 (July to September 1872).—One of the most important contributions contained in these three numbers is a translation of Prof. Nordenskiöld's account of his expedition to Greenland, which runs through the whole of them, and is not yet completed. With a good deal of general matter, this paper includes a vast amount of interesting geological information, and it must be welcome to English geologists, few of whom could make much out of it in its original Swedish dress. This translation is illustrated with the original plates, maps, and woodcuts.—Another highly important memoir, which appears in two parts in the July and August numbers, is Dr. H. B. Holl's essay on those most puzzling objects, the fossil sponges.—In the August number Prof. Allman gives us a note on a fossil *Hydractinia* from the Coralline Crag, the *Cellepora echinata* of Michelin.—Mr. S. V. Wood, jun., has some further remarks on Mr. Geikie's correlation of the glacial deposits; and Mr. J. Lucas a paper on the Permian Beds in Yorkshire, one portion of which calls forth a note by Mr. J. Clifton Ward, on rock-staining, in the September number.—The latter further contains a notice of the occurrence of the genus *Cupressocrinus* in the English Devonian, near King's Teignton, the first part of a paper, by Mr. Alfred Tylor, on the formation of Deltas, and some other papers, among which we may mention especially Mr. Woodward's description of a new species of Phalangiiform Arachnide (*Architarbus subovalis*) from the Lancashire Coal Measures, which is especially interesting from its generic identity with a North American form.

THE *Memoirs of the Natural History Society of Bremen* for 1872 (Abhandlungen herausgegeben vom naturwissenschaftlichen Vereine zu Bremen, Band iii. Heft 1) contain some exceedingly valuable papers for the study of zoological and botanical geology. In the former department we have Dr. O. Finsch's contribution to the ornithology of North-western America, from which inhospitable region the author records about 120 species of birds, many of them possessing a very wide geographical range. Singularly enough the author does not describe a single new species, but of some variable forms detailed descriptions are given, and with regard to many others we find valuable synonymic and descriptive remarks.—The flora of high northern latitudes receives a contribution in the shape of a list of the vascular plants of Spitzbergen and Bear Island, by Dr. T. M. Fries.—The student of the geographical distribution of European plants will find most valuable information in M. C. Nöldeke's Flora of the East Frisian Islands (including Wangeroog) which treats of the vascular plants in a most exhaustive fashion, and is supplemented by a short notice of the mosses of the islands, by M. C. E. Eiben.—From Drs. Buchenau and Focke we have an important paper on the *Salicorniæ* of the Baltic coasts of Germany, which includes a discussion of the views of previous authors on the species of that genus.—Dr. Buchenau has also a paper on the variation of the curious bracts of the lime tree.

SOCIETIES AND ACADEMIES

SAN FRANCISCO

Academy of Sciences, May 20.—Dr. Blake, on presenting some stone implements that had been found in stratified rock, at an elevation of 1,700 feet, observed there can be no doubt that up to the present time the earliest traces of man's existence on the earth have been found in this country. The skull found in the Pliocene deposits in Table Mountain is certainly the oldest human skull that has yet been discovered. Many stone mortars have also been taken out from the same deposits. I have examined the spot where one of these mortars was taken out ten feet beneath the surface of the Pliocene gravels on the Sierrasr and as this was some six hundred feet above the valley and near the top of a rolling hill, there was no possibility of the strata having been disturbed. The objects I now have to present to the Academy furnish important evidence on this point. They are two implements cut in serpentine, and evidently fashioned by the hand of man, or of some animal capable of using its anterior extremities so as to fashion objects to meet its wants, and apparently possessed of sufficient intelligence to use lines or nets for catching fish, as it would seem that these instruments must have been used as sinkers. They are cut in serpentine, the surface of which is slightly weathered to the depth of about $\frac{1}{20}$ of an inch. One is pear-shaped, ¾ in. long, and 5½ in. in circumference at its largest part; near the smaller end is a hole passing through it, and immediately above this is a notch passing across the end. The other instrument is cylindrical, thicker in the middle than at the ends; it is 5½ in. long, and 3½ in. in circumference at its thickest part. There is a hole through it at about an inch from one end, and above the hole is a notch passing across the end. The spot where they were found is on a rolling hill within a few feet of the summit of the coast range, and at an elevation of about 1,700 feet. They were met with in digging away the side of the hill, at about eight feet from the surface, four feet being alluvium, and four feet argillaceous shales, in which they were found embedded. These, and four other instruments of the same form, were found in a space of about two square feet. A great deal of alluvial soil had been removed whilst levelling the ground for a house, but no instruments had been found until the shales were dug into. In company with Prof. Whitney I visited the spot, and we have not the slightest doubt but that they were taken out at the place indicated. As to the geological age of the rock in which they were embedded, this is to a certain extent undetermined. It certainly cannot be later than the Pliocene, and Prof. Whitney is of opinion that it is still older. Dr. Blake then made some remarks as to the absence of anything like a rim to the Great Basin, north of the Puebla Mountains. In going north from the valley of the Humboldt near Mill City to the Puebla Valley, the highest elevation crossed between the Rattlesnake and Vicksburg ranges did not exceed three hundred feet, whilst the country to the east of this, between the Rattlesnake and Umsham ranges, is at a still lower level. North of the Puebla Buttes nothing but some low ranges are found until we reach the head waters of the Owhyee, a tributary of the Columbia, so that there can be no doubt but that the larger part of the waters of the Great Basin must have escaped through the valley of the Columbia. The quantity that was left for evaporation did not probably exceed from 100 to 150 feet, as he had not found concretionary deposits at a greater height than 100 feet above the present level of the Humboldt.

BOOKS RECEIVED.

ENGLISH.—The Vegetable World L. Figuier, English edition (Cassell and Co.).—A Manual of Microscopic Mounting: J. H. Martin (Churchill).

FOREIGN.—(Through Williams and Norgate).—Thesaurus Ornithologiæ, 1^{er} Band, 2^{te} Heft: Dr. C. G. Giebel.

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